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Cultivar description

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Fraydo tall fescue (*Festuca arundinacea* L.)

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Abstract. Fraydo, a 10-parent synthetic cultivar based on selection from Melik tall fescue is a most productive, highly winter-active cultivar that exhibits little summer activity. Its summer dormancy is associated with persistence over long hot summers. It has an erect growth habit with a long stem and short spike length relative to other cultivars. Maturity, as reflected by date of head emergence, is similar to that for Demeter. Fraydo is well adapted to the environment of south-western Victoria where the original parental selections were made. Fraydo is especially productive in the 7–8 month growing season/550–700 mm annual rainfall districts. Evidence is emerging that it is highly palatable to sheep and well adapted to a wide range of environments in temperate Australia.

Origin

Fraydo tall fescue is a synthetic variety bred using 10 plants selected from cv. Melik, a summer-dormant, persistent Israeli accession that exhibits high autumn and winter activity. Cultivar Melik was registered by the Department of Agriculture, Western Australia, in 1971 (Oram 1990). A nursery consisting of 3550 spaced plants of Melik was established in the field at Hamilton in 1989 and subjected to close (rotational) grazing by sheep. After 3 years of assessment, 6 clones from each of 49 highly winter-active and phenotypically superior plants were planted in an isolated nursery and allowed to intercross. Seed was harvested from each of the 49 half-sib families and a bulk, designated Melik Select, was generated by mixing equal quantities of seed from each family — primarily to facilitate simultaneous evaluation of prototype material as swards.

Half-sib families were sown as replicated 1 m rows in progeny evaluation field trials at a property located between Harrow and Balmoral, about 80 km north-west of Hamilton (590 mm mean annual rainfall) and at Hamilton (690 mm mean annual rainfall). An incomplete block α lattice experimental design was used with cultivars Melik, Melik Select, AU Triumph and Demeter sown as checks. During 1993–96, the half-sib families were rated for seedling vigour, seasonal yield (at 4–6 weekly intervals, visual ratings calibrated against yield of cut, dried herbage), autumn recovery, rust (*Puccinia graminis*) and leaf texture. Mean seasonal and annual yields were calculated and weightings assigned to various parameters depending on their relative importance and critical objectives. A selection index was developed and the families ranked. Independent culling was used to remove high ranked families that had low seedling vigour and/or poor autumn recovery. Winter growth was emphasised with the highest weighting in the selection index with autumn recovery given second ranking.

Eighteen half-sib families that were rated as having a relatively high seed yield were also sown as 2×1 m swards at Hamilton in March 1995 and, during 1995–96, rated against Melik Select, Demeter, AU Triumph, Advance, Cajun and Dovey. Results of this complementary assessment confirmed the value of some families for seedling vigour and cool-season vigour when grown in swards.

Many families were superior to the commercial cultivars. Ten elite parent plants were selected to form the synthetic variety. These had a mean rating for seedling vigour, cool-season vigour and persistence that was greater than Demeter and AU Triumph by 40, 50 and 40% respectively (mean of both sites). Seven of these were amongst the high seeding group. The 10 selected parental plants were polycrossed in a pollen-proof chamber to produce synthetic 1st generation seed in 1997. Subsequent seed multiplication was carried out under field conditions, using 4500 plants surrounded by an isolation barrier of triticale. This resulted in the production of 14 kg of syn 2 generation, pre-nucleus seed. Tests were conducted to ensure that selected families, syn 1 and syn 2 were endophyte (*Neotyphodium coenophialum*) free and not inferior to the cultivars in nutritive value.

Morphological description

Fraydo tall fescue was compared for distinctiveness with the cultivars, Bombina, Demeter, Flecha, Melik, Midwin and Resolute. It was shown to have a relatively erect, bushy habit of growth. Relative to other cultivars, leaf length (17.7 cm) and width (7.2 mm) are described as medium. Its infloresence

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Table 1. Density and yield of tall fescue. Results from a cultivar experiment sown at Cavendish, Victoria, in June 2000 (M. W. Anderson, J. F. Chin and B. Eagleson unpublished data)

Cultivar	Plant density in winter 2000 (plants/m^2)	Autumn + winter growth in year 4, to 7 Aug. 2003 (DM, t/ha)	Cumulative yield over 3 years (DM, t/ha)	Plant density in Feb. 2004 (plants/m^2)
Advance	553	1.49	35.54	62.2
Flecha	533	3.22	40.97	94.8
Fraydo	527	4.54	47.94	104.4
Prosper	570	3.42	41.80	99.6
l.s.d. (P = 0.05)	53.6	1.431	2.687	14.81

exhibits early emergence, early flowering and a short to medium spike length (2.6 cm). Spikelet length is relatively large (1.5 cm). It was distinguished from Melik by its longer stem and shorter glume (Avery and Anderson 2000).

Agronomic characters

Prototype

The parent source, cultivar Melik, tolerated waterlogging well on shallow duplex soils without exhibiting nitrogen deficiency symptoms (Rodgers and Beresford 1970). It demonstrated outstanding persistence and cool-season vigour relative to commercial perennial grass cultivars (Rodgers and Bailey 1981). Following its evaluation in cultivar trials in south-western Victoria, Melik was recognised for its winter growth potential (Reed 1987), its high level of resistance to rust (*Puccinia graminis* ssp. *graminis,* Villata and Clark 1995) and its fast rate of germination (Smith 1999).

From a rotationally grazed experiment conducted near Balmoral in the 600 mm rainfall area of south-western Victoria, where it was compared with AU Triumph and Demeter, the prototype, Melik Select, stood out as the most suitable tall fescue for pasture production and persistence (Anderson *et al*. 1999). In similar work over 3 years at Hamilton, the cumulative yield of tall fescue did not differ between AU Triumph, Demeter and Melik Select but there was a 73% increase in winter growth when Melik Select was compared with Demeter. Melik Select produced 55% of its production in winter and Demeter 33%. Melik Select plots were characterised by higher contributions from subterranean clover (*Trifolium subterraneum* L.). Plots were maintained under rotational grazing by sheep for a further 3 years and the presence of tall fescue was assessed in the seventh year. The frequency of Melik Select (63%) was greater than that of Demeter (9%) and AU Triumph (8%) (P<0.01). Melik Select exhibited greater rust resistance than Demeter and AU Triumph. Melik Select–Demeter blends provided a more even distribution of growth over the year (Reed *et al*. 2004).

Fraydo

Sward evaluation experiments of Fraydo were commenced in 1998. At Balmoral over a 4 year period of rotational grazing by sheep, annual rainfall averaged 545 mm and the persistence of Fraydo was more than double that of the other cultivars and comparable with phalaris (*Phalaris aquatica*), cv. Australian. In years 2 and 3, the winter growth of Fraydo was more than 3 times that of AU Triumph and Demeter. Evaluation of blends of Fraydo:Demeter showed that the proportion of Fraydo in the seed mixture appeared to be linearly related to increasing winter herbage growth (Jahufer *et al*. 2002). Fraydo produced significantly more herbage than other cultivars of tall fescue when it was compared with Advance, Prosper and Flecha over a 3-year study near Cavendish (20 km north of Hamilton) in western Victoria (Table 1).

Fraydo was evaluated in Australian Pasture Plant Evaluation Committee experiments in north-east and south-west Victoria where its performance was similar to that in the Balmoral experiment (M. A. Anderson unpublished data). Following the 2002 drought, the persistence of unirrigated seed crops of Fraydo tall fescue, which were established in 1999 and 2000 in the south-east of New South Wales, was outstanding relative to other cultivars (D. McKenzie pers. comm.). Its persistence (relative to AU Triumph) after 3 years continuous grazing by sheep was superior in field experiments conducted near Yass and Tamworth in New South Wales (Culvenor *et al*. 2003).

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